ATTACHMENT J.4.80

DESIGN PACKAGE

ED-12-4004

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SITE PROCEDURE ED-12-4004
REVISION NO. 3

DESIGN PACKAGE

ED-12-4004

Effective Date: August 15, 1997

Originator (Subject Expert): F. T. Jebens — Date: 8/11/97

Checker Concurrence: W. E. Kortier — Date: 8/11/97

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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TABLE OF CONTENTS

LIST OF ATTACHMENTS

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
11/15/93	A	Procedure written to instruct Engineering personnel how to prepare Title I/II design documentation per Request No. S93-133, initiated by T. Rich. This procedure supersedes ENG-02-1501, "Title I/II Design Package Preparation".
09/16/94	0	Revised document describing design package preparation. Initiated by R. Worsley.
05/20/96	1	Revised document describing design package preparation. Initiated by F. T. Jebens.
01/10/97	2	Revised document updating design package preparation to include remediation work plans. Initiated by F. T. Jebens.
08/15/97	3	Revised document updating design package preparation to include Fluor Daniel Fernald, (FDF), re-engineering organizational changes. Initiated by G. C. Olbur.

1.0 PURPOSE

The purpose of this procedure is to describe the development of the preliminary and definitive design phases of a project, and the preparation of the design package required for construction.

2.0 SCOPE

This procedure outlines the activities associated with preliminary and definitive design and applies to projects executed by the A-E firms, as agreed upon in writing with the Fluor Daniel Fernald, (FDF) Project Manager. FDF personnel assigned to smaller projects must use this procedure on a graded approach.

3.0 REFERENCES

1. CM-0001, "Configuration Management"
2. ED-12-2007, "ALARA Review"
3. ED-12-4006, "Specification Preparation and Issue"
4. ED-12-4007, "Drawing Preparation and Issue"
5. ED-12-5001, "Engineering/Construction Document Control"
6. ED-12-5002, "Engineering Design Change Processes"
7. ED-12-6002, "As-Built/Red-line Drawing Process"
8. ED-12-7001, "Engineering Interfaces"
9. ED-12-9001, "Engineering Quality Management"
10. ED-12-9004, "Project Closeout"
11. MS-1021, "Project Management"
12. MS-1003, "Alignment Process"
13. RM-0033, "Government Property Management Requirements"

4.0 RESPONSIBILITIES

Project Engineer (PE) - An engineer responsible for document preparation, coordination, and/or performance of engineering functions for a project. A signature by the Project Engineer indicates that the issues involved with Unreviewed Safety Questions,(USQ), Configuration Management,(CM), Change Proposal,(CP), and interdisciplinary reviews have been resolved.

4.0 RESPONSIBILITIES (cont.)

Project Manager (PM) - A functional position in which the designated person is in charge of managing and directing the project functions to which they are assigned. An experienced individual assigned to coordinate, integrate, and/or oversee activities for a specific project including scope, cost, schedule, quality, and customer/participant satisfaction. (See Site Procedure MS-1021, "Project Management")

Project Management Team (PMT) - A team of personnel authorized and responsible to represent various departments, Functional Areas, and subcontracted organizations, that are assembled to participate in and/or contribute to project engineering activities. Generally, the team will be assembled during Design initiation and will ensure implementation of the Project Execution Plan (PEP) for a project through all phases, including design, construction, startup, and closeout.(In Accordance With, (IAW), MS-1021, Project Management").

Engineering/Construction Document Control (ECDC) - Distributes and maintains engineering deliverables (drawings, specifications, and data sheets) and supplier documents.

5.0 GENERAL

The Engineering department within Soils and Water Projects Division has overall responsibility for oversight of the Engineering Design (ED) Functional Area and other design services to ensure remediation of the FEMP. Preparation of the design package requires developing the engineering deliverables necessary for construction.

This phase involves not only implementation of the PEP and development of design deliverables but also regular performance feedback and monitoring such that the project management team keeps constantly informed and motivated to improve their own, and the projects performance.

In addition to drawings, specifications, cost estimates, and data sheets, there are also work plans which may include RD/RA work plans, procedures, and instructions that track and facilitate the design/construction effort. Typically, design reviews occur at 30, 60, 90 percent and at completion. Ongoing feedback from project stakeholders is accomplished by follow through in regular status meetings. This includes design, construction services, operational issues, ALARA, safety and health, property management, and closeout activities.

6.0 PREREQUISITES

1. Approved functional requirements, conceptual design, design criteria package, and ALARA review have been completed according to Site Procedures ED-12-4001, ED-12-4002, ED-12-4003, and ED-12-2007.

2. Approved baseline and funding.

7.0 PROCEDURE

7.1 PLANNING FOR DESIGN PACKAGE

PROJECT MANAGER (PM)/PROJECT ENGINEER (PE)

1. Initiate project according to Site Procedures MS-1021, ED-12-3001, and ED-12-4001.

2. Obtain authorization from the CAM.

3. Prepare requirements for the design organization according to Site Procedure ED-12-7002, "Request for Engineering Services" for FDF or subcontract support as necessary, according to Site Procedure ED-12-2005, "A/E Subcontract".

4. Clarify scope, budget, and scheduled milestones with Project Management Team (PMT).

7.2 PREPARING ENGINEERING DOCUMENTS

PROJECT ENGINEER (PE)

1. Using the information developed during the alignment, verify the effort required for the scheduled deliverables.

2. Ensure that preliminary design details have been prepared and documented according to Site Procedures ED-12-4005, "Calculations," and ED-12-4009, "Process Flow Diagram."

3. Provide/coordinate information for preparation of drawings according to Site Procedure ED-12-4007, "Drawing Preparation and Issue."

4. Provide/coordinate information for preparation of specifications along with data sheets for all mechanical equipment and control systems according to Site Procedure ED-12-4006, "Specification Preparation and Issue."

5. Generate equipment lists, drawing and specification lists, instrument index, and key drawing indices as applicable. (Attachment A)

6. Prepare independent government (cost) estimate,(IGE) for the field work.

7. Provide preliminary project property list to Property Management per Site Procedure ED-12-9004, "Project Closeout."

7.3 REVIEW OF ENGINEERING DOCUMENTS

Note: ***Depending on the complexity of the Design Project, reviews may be required at 30 percent, 60 percent, 90 percent and upon completion. (See Site Procedures ED-12-4015 and ED-12-4010). The reviewers will be identified in the work plans and will include, at times, DOE and EPA, as well as FDF.***

PROJECT ENGINEER (PE)

1. Prepare the document Distribution Matrix for Engineering/Construction Document Control, (ECDC). (See Site Procedure ED-12-5001, "Engineering/Construction Document Control" and Attachment B, "Typical Document Categories")

2. Provide appropriate documents to ECDC for distribution to reviewers.

3. Resolve and incorporate comments according to Site Procedures ED-12-4010, "Design Verification."

4. Review to ensure that all deliverables are organized, accounted for, and have the proper design organization signatures and submit revised documents to ECDC.

7.4 ISSUE DESIGN PACKAGE

ENGINEERING/CONSTRUCTION, DOCUMENT CONTROL (ECDC)

1. Number, log, and file the original Project documents.

2. Issue controlled documents per the Distribution Matrix.

3. Retain approved Design Package for further action (construction, field changes, etc.).

7.5 OVERSIGHT

PROJECT MANAGEMENT TEAM

1. Review the Project Execution Plan periodically with project management team to verify continuing focus or need for change control of the design package.

8.0 RECORDS

The following records will be generated as a result of this procedure:

1. Controlled copy of the CFC documents, maintained at ECDC.

2. All other correspondence directing action will be processed per Site Procedure ED-12-5001, "Engineering/Construction Document Control".

9.0 DRIVERS

1. RM-0012, "Quality Assurance Program"
2. RM-0016, "Management Plan"

10.0 DEFINITIONS

Activity - A specific set of operations or related tasks to be performed (e.g., characterization, design, dismantling, and overpackings) to fulfill a defined function.

Architect-Engineer (A-E) - A subcontracted engineering firm which is technically qualified to perform design or documentation activities which involve facility construction, operation, decontamination, Remedial Design/Action, CERCLA Removal Actions, RCRA Closures, or other modification.

Construction Services (Title III) - Implementation of engineering oversight, change control, and inspection necessary to ensure construction, workmanship, and materials conform to specifications and that the final drawings reflect as-built considerations.

Control Account Manager (CAM) - The responsible manager of funded activity with overall financial accountability who plans, requests, and/or authorizes activities within the approved baseline.

Definitive Design (TITLE II) - Engineering effort which continues the development of the detailed project design based on approved preliminary design (Title I). Definitive design includes any revisions required of the preliminary design effort; preparation of final working drawings, specifications, bidding documents, cost estimates, and coordination with all parties that might affect the project; development of firm construction and procurement schedules; and assistance in analyzing proposals or bids. Verified drawings and specifications are signed by the lead discipline engineer in the design organization. The technical section of the bid package is transmitted under the signature of the Engineering Manager.

Design Criteria - Technical data and scope information developed during project planning, feasibility studies, and conceptual design for use in developing the definitive design.

Design Package - An approved set of engineering documents including drawings, specifications, data sheets, project work plans/instructions and status reports necessary for construction.

Document - Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

10.0 **DEFINITIONS** (cont.)

Engineering/Construction Document Control (ECDC) - The system by which active engineering documents are identified, controlled, distributed, and maintained during the course of a project and maintains the RCI/DCN system after facility turnover.

Equipment List - A listing of all tagged equipment (components) on the project used in the early phases of the project to communicate the scope of work to all engineering disciplines and Project Controls.

Functional Requirements Document (FRD) - Those technical data and other project information developed during the project identification phase. They define the project scope, requirements, design parameters, applicable design codes, standards, and regulations (including 10CFR and 40CFR requirements); applicable health, safety, fire protection, safeguards, security, energy conservation, ALARA concepts, and quality assurance requirements; and other requirements such as Records of Decision, Remediation Work Plans, Safety Assessments, Auditable Safety Records, Safety Analysis Reports, etc. The project functional criteria, developed using project alignment and value engineering principles, are normally consolidated into a document which provides the technical base for any further design performed after the criteria are developed.

Preliminary Design (TITLE I) - Continues the engineering effort utilizing the conceptual design and the project design criteria as a basis for project design development. Preliminary design develops the requirements and criteria which will govern the definitive design. Tasks include preparation of preliminary planning and engineering studies, performance grading, preliminary drawings and outline specifications, life-cycle cost analysis, preliminary cost estimates, and scheduling for project completion. Preliminary design provides identification of long lead procurement items and analysis of risks associated with continued project development. This effort is the design basis which is presented to the TRB for approval.

Project - A project is a unique activity effort within a program which has firmly scheduled beginning, intermediate, and ending date milestones; prescribed performance requirements; prescribed costs; and close management, planning, and control. A project is a basic building block which could include D&D in relation to a program which is individually planned, approved, and managed. A project is not constrained to any specific element of the budget structure (e.g., operating expense, plant projects, and/or capital equipment). Construction, if required, and closeout is part of the total project. A project is managed IAW MS-1021, "Project Management".

Project Execution Plan - Defines the technical scope of the effort detailed to a level commensurate with the nature of the effort. Anticipated deliverables shall be incorporated into the scope with their schedule and budget. Project Execution Plans are intended to be factual, short, and summary documents. The plan shall address the elements of control as well as other information needed for good work management.

10.0 **DEFINITIONS** (cont.)

Project Manager (PM) - A functional position in which the designated person is in charge of managing and directing the project functions to which they are assigned. An experienced individual assigned to coordinate, integrate, and/or oversee activities for a specific project including scope, cost, schedule, quality, and customer/participant satisfaction. (See Site Procedure MS-1021, "Project Management")

Project Management Team (PMT) - A functional team in which the members manage and direct the project work in accordance with the PEP and Site Procedures. These experienced personnel coordinate, integrate, and/or oversee activities throughout the life of a specific project including scope, cost, schedule, quality, and customer/participant satisfaction.

Remedial Design (RD) - A sub-activity in remedial response where the selected remedy is clearly defined and/or specified in accordance with engineering criteria (i.e., a site action plan, a relocation plan, or engineering drawings or specifications).

Startup - The phase of a project following construction associated with planning and preparing a facility and its systems for operations.

ATTACHMENT A

INDICES AND LISTS DESCRIPTION

INDEX/LIST TITLE	DESCRIPTION
Equipment List	The equipment list may contain basic information about each item of equipment such as equipment number, service description, dimensions, size, capacity, weight, horsepower, purchase order number, and flow sheet reference. The list also contains detailed information on design pressures and temperatures, Minimum Design Metal Temperature (MDMT), insulation, materials for components such as shell or heads, corrosion allowance, and special welding or treatment. It is the one single document that summarizes all essential details on each equipment item. The PM uses the list as a reference document and as one of the items forming a basis of estimate.
Specification Index	This index is produced by the control system group. It is a vital document in the accurate specification and design of the entire control system for a plant and serves many functions. The index is separated into two sections that are titled engineering and piping. Both sections use a common database and are produced using PC based software.
Instrument Index	The engineering section contains a description and a complete listing by tag number of each instrument, its plant location, and purchase order information. The piping section of the index, using the same database as above, lists instruments by tag number and provides complete information regarding installation details, loop drawing number, and other pertinent design and field installation details. The control systems discipline is responsible for keeping the index current. The PM is responsible for issuing the index periodically throughout the job. Consequently, index must be treated like a drawing for issue purposes and may be allocated a drawing number.
Key Drawing Indices	Key drawing indices are produced by each design discipline. These are drawings, usually plot plans, which are overlaid with a grid showing the extent of coverage of the individual layout drawings for that discipline. The indices will show the actual drawing number for each layout drawing. The indices are used as a reference document by the disciplines and are issued as discrete drawings by the PM.

ATTACHMENT B - TYPICAL DOCUMENT CATEGORIES

The following lists the primary documents in their functional category. These documents interrelate with each other as further described in the various ED procedures.

Technical Train

- Project Execution Plan
- Functional Requirements Document (FRD) or equivalent
- Conceptual Design Report (CDR) or equivalent
- Design Criteria
- ALARA Review
- Design Basis (30%)
- Treatability, pre-design studies
- Preliminary Design (Title I)
- Definitive Design (Title II)
  - Drawings
  - Specifications
  - Work Plans - Remedial Action, task specific, etc.
- Bid Package
- Change Control (RCI/DCN/CP)
- Construction Services (Title III)
  - Field Inspection
  - Waste Plan
  - Verification Plan
- Property Assets
- Closeout Report

Project Control Train

- Baseline
  - Technical
  - Budget
  - Schedule
- Control Account Authorization
- Periodic Statusing
- Change Management
- Funds Management
- Financial Closeout

Environmental Train

- Site Assessment (SA, RSE, etc.)
- Needs Investigation (Sampling & Analysis)
- Summary Report (RI, RAWP, etc.)
- Environmental Risk (BRA, RAWP)
- Corrective Action (FS, RAWP, Closure Plan)
- Approval (ROD, EPA Letter of Approval)
- Implementation (RD/RA Work Plan, RAWP, Closure Plan)
- Compliance Sampling (CAA, CWA, RCRA, etc.)
- Verification Report

ATTACHMENT B - TYPICAL DOCUMENT CATEGORIES (cont.)

DOCUMENT CATEGORIES

Health & Safety Train

- Site Health and Safety Plan
- Functional Division Health and Safety Plan
- ALARA Assessment/Review
- Project Specific Health and Safety Plan
- Safety Assessment
- Hazards Analysis
  - Preliminary
  - Final
- Safety Analysis Report
  - Preliminary
  - Final

Operations Train

- PFD
- P&ID
- Electrical Elementaries & Switchgear
- Equipment Lists
- Maintenance Engineering
- Spare parts
- Operation & Maintenance Manuals
- Startup Plan
- Systems Operability Testing
- Procedures
- Operator Training
- Raw Material Specifications
- Operational Readiness
- Property Assets

Other Regs

- NPDES
- NEPA
- TSCA
- FARs
  - Davis-Bacon
  - Procurement
  - Property Management